UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/670,061	09/24/2003	William S. Eaton	200207971	5094

22879 7590 05/07/2008

HEWLETT PACKARD COMPANY
P O BOX 272400, 3404 E. HARMONY ROAD
INTELLECTUAL PROPERTY ADMINISTRATION
FORT COLLINS, CO 80527-2400

EXAMINER	
QIN, YIXING	
ART UNIT	**PAPER NUMBER**
2625	

NOTIFICATION DATE	DELIVERY MODE
05/07/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

JERRY.SHORMA@HP.COM
mkraft@hp.com
ipa.mail@hp.com

Office Action Summary	Application No.	Applicant(s)	
	10/670,061	EATON, WILLIAM S.	
	Examiner	Art Unit	
	Yixing Qin	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 February 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-24* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-24* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *9/24/03* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

In response to applicant's amendment received 2/8/08, all requested changes have been entered.

Response to Arguments

The first argument is that the prior art Barbour only discloses that the magnitude of the voltage is applied to all of the primitives. This is difference than doing so for subsets of the print firing cycles. First of all, a set is by definition a subset of itself. Thus, even if the voltage is applied to all of the primitives, it is by definition applied to at least one subset, which is itself (i.e. all of the primitives). The applicant's specification only gives examples that the subsets can be 8, 16 or 64 firing resistors, but is silent to how many total firing resistors may comprise. Thus, from the information given it would be conceivable that the subsets can be bigger like 128 or 256 firing resistors, and the total number of firing resistors can coincide with one of these values.

Furthermore, as Barbour does explain in column 8, lines 18-48 that the leading resistor of each column firing first, and as the print head moves the leading resistors will change. Thus, this group of variable leading resistors can be interpreted as a subset of the total number of firing resistors. Also, in column 14, line 40-column 15, line 14 discloses that the firing sequence may be variable.

However, the newly amended claims claim new features not disclosed by Barbour. The arguments are directed towards theses newly amended features. A new reference, Ahne et al (U.S. Patent No. 6,409,298) is used to teach the adjusting of a

magnitude of voltage in dependence on the variable number of firing resistors to be fired. This in combination with the Barbour reference would suggest the currently claimed invention. This action is made FINAL.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 1-24 rejected under 35 U.S.C. 103(a) as being unpatentable over Barbour et al (U.S. Patent No. 6,318,828) further in view of Ahne et al (U.S. Patent No. 6,409,298)

Regarding claims 1, 13, Barbour discloses a driver circuit for driving simultaneously a variable number of firing resistors for a printhead during a printing firing cycle, the driver circuit comprising:

a drive circuit for supplying firing pulses for firing the variable number of firing resistors during a printing firing cycle; (Fig. 2. 1b – firing controller 130)

It does not explicitly disclose “a circuit for adjusting a magnitude of a voltage or a current of said drive signal during a printing firing cycle in dependence on the variable

number of firing resistors to be fired simultaneously in a given subset during the printing firing cycle."

However, Barbour does disclose in column 25, lines 30-63 – this section describes the proper amount of voltage to deliver to the resistors. Also see Fig. 1b, item 124. The secondary reference, Ahne discloses in column 5, lines 1-50 discloses the variation of voltages across heater resistors. Especially, see lines 13-20, 42-50.

Barbour and Ahne are combinable because both are in the art of providing voltage to resistors for firing printhead nozzles.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have used a variable voltage delivery system.

The motivation would have been to ensure the proper amount of voltage is provided for a varying amount of resistors to be fired.

Therefore, it would have been obvious to combine Barbour and Ahne to obtain the invention as specified.

Regarding claims 2, 14, Barbour discloses the driver circuit of claim 1, wherein said drive circuit is a voltage source, and said circuit adjusts a voltage magnitude of said drive signal. (Fig. 1b, and column 5, lines 12-40)

Regarding claims 3, 15, the secondary reference, Ahne discloses the driver circuit of claim 2, wherein said circuit adjusts the voltage magnitude in dependence on said variable number of firing resistors being simultaneously fired. (column 5, lines 13-

20, 42-50)

Regarding claims 4, 16, Barbour discloses the driver circuit of claim 3, wherein said circuit provides an increased voltage magnitude for larger variable numbers. (column 28, line 45-65)

Regarding claims 5, 17, the secondary reference, Ahne discloses the driver circuit of claim 2, wherein said drive circuit supplies a voltage of a predetermined magnitude, and said circuit applies a data variable offset voltage dependent on said variable number of firing resistors and a fixed offset voltage not dependent on said variable number of firing resistors. (column 5, lines 11-20 discloses that there is a constant drive voltage Vph, which is not dependent, and also a voltage regulator and digital potentiometer for adjusting the voltage across the resistors.).

Regarding claims 6, 18, Barbour discloses the driver circuit of claim 5, wherein said offset voltage is inversely proportional to the variable number of firing resistors. (Fig. 27, and column 29, line 62 – column 30, line 11)

Regarding claims 7, 19, Barbour discloses the driver circuit of claim 2, wherein said offset voltage is a monotonically increasing function of said variable number of firing resistors. (Fig. 27)

Regarding claims 8, 11, Barbour discloses in a printhead control apparatus comprising a driver circuit for providing energy pulses to a set of firing resistor loads connected in parallel, each load having a switch for connecting the load to the driver circuit so that a variable number of the loads can be simultaneously connected to the driver circuit to receive energy pulses during a printing firing cycle (Fig. 4), a method for maintaining nominally constant energy in an individual load (Fig. 27) , the method comprising:

determining the variable number of the loads to be simultaneously connected to an energy source for the printing firing cycle during a given subset of the printing firing cycle; (column 28 , lines 32-57 – one example giving is when all resistors need to be fired)

adjusting a voltage magnitude or current magnitude of the energy pulse in dependence on the variable number during the given subset of the printing firing cycle, so that the voltage magnitude or current magnitude increases as the variable number increases to maintain a nominally constant energy applied to the load independent of the variable number. (Fig. 27, and column 29, line 62 – column 30, line 11. Again, also see the rejection from claim 1 above for the newly amended portions of this claim.)

Regarding claims 9, Barbour discloses the method of claim 8, further comprising: adjusting a pulse width of the energy pulse in dependence on the variable number, so that the pulse width increases as the variable number increases. (column

28, lines 45-57)

Regarding claims 10, 12, Barbour discloses the method of claim 8, wherein said energy source is a voltage source for providing a supply voltage having a constant source voltage magnitude, and wherein:

said adjusting a voltage magnitude comprises applying a voltage offset to said constant source voltage magnitude, and wherein a value of said voltage offset is inversely proportional to the variable number. (Fig. 27, and column 29, line 62 – column 30, line 11 and column 29, lines 39-47 – the margin of safety is an offset set, so that the resistors are properly fired).

Regarding claims 20, 23, Barbour discloses a driver circuit for firing simultaneously a variable number of firing resistors for associated nozzles in a printhead, the driver circuit comprising:

an energy source for providing electrical power to fire said firing resistors; (column 25, lines 30-63 – this section describes the proper amount of voltage to deliver to the resistors. Also see Fig. 1b, item 124)

a nozzle counter for determining a nozzle count of the variable number of nozzles whose resistors are to be fired in a given printing firing cycle; (column 20, lines 49-64)

a programmable offset generator for generating an output control voltage or current dependent on said nozzle count during a given subset of the given printing

firing cycle ; (column 29, lines 39-47 – the margin of safety is an offset set, so that the resistors are properly fired)

a drive circuit having an output connected to a circuit output terminal for connection to the printhead, said drive circuit for selectively applying variable voltage or current from said energy source to the circuit output in dependence on said output control voltage or current during the given subset of the given printing firing cycle. (Fig. 2. 1b – firing controller 130 and Fig. 27, and column 29, line 62 – column 30, line 11. Again, also see claim 1 for further description.)

Regarding claim 21, the secondary reference, Ahne discloses the circuit of claim 20, wherein said energy source is a voltage source, and said programmable offset generator generates a data variable offset output control voltage of a magnitude dependent on said nozzle value and a fixed offset output control voltage of a magnitude not dependent on said nozzle value. (column 5, lines 11-20 discloses that there is a constant drive voltage Vph, which is not dependent, and also a voltage regulator and digital potentiometer for adjusting the voltage across the resistors.)

Regarding claims 22, 24, Barbour discloses the circuit of claim 21, wherein said output control voltage value is proportional to the variable number of firing resistors. (Fig. 27, and column 29, line 62 – column 30, line 11)

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yixing Qin whose telephone number is (571)272-7381. The examiner can normally be reached on M-F 9:30-6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Twyler Lamb can be reached on (571)272-7406. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

YQ

/Mark K Zimmerman/

Supervisory Patent Examiner, Art Unit 2625